Critical Thinking Questions

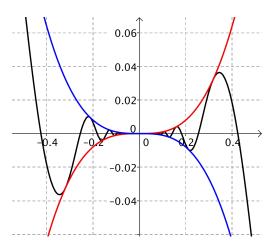


Figure 1: The Squeeze Theorem

- 1. \blacksquare Let's examine the function $y = \frac{x}{3x^2 + x + 1}$.
- 2. This is the symbol for the set of all real numbers: \mathbb{R} .
- 3. This is the symbol for the set of integers: \mathbb{Z} .
- 4. This is the symbol for the set of rationals: \mathbb{Q} .
- 5. Is it possible for a sequence to converge to two different numbers? If so, give an example. If not, explain why not.
- 6. Explain how to use partial sums to determine if a series converges or diverges. Give an example.
- 7. Explain why $\int_{1}^{\infty} f(x) dx$ and $\sum_{n=1}^{\infty} a_n$ need not converge to the same value, even if they are both convergent.
- 8. In your own words, explain the Alternating Series Remainder Theorem. How is this theorem useful?
- 9. Explain the difference between absolute and conditional convergence. Give an example of each.
- 10. The Ratio Test is inconclusive if $\lim_{n\to\infty}\left|\frac{a_{n+1}}{a_n}\right|=1$. Give an example of one convergent series and one divergent series for which $\lim_{n\to\infty}\left|\frac{a_{n+1}}{a_n}\right|=1$. Explain how you determined your examples.

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